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NOTICES OF The Aëronautical Society.

The opening meeting of the Thirty-ninth Session of the Aëronautical Society of Great Britain will be held at the Society of Arts, John Street, Adelphi, early in December.

On this occasion the report of the recent International Kite Competition will be read, the mathematical portion being prepared by Professor C. V. Boys, F.R.S., President of the Mathematical and Physical Section, British Association, and the descriptive portion by Mr. Eric Stuart Bruce, M.A. Oxon.

The other arrangements of the meeting will be duly announced.

THE LIBRARY.

Arrangements are being made for the Library of the Society to be open to members at stated times early in the new year, and full particulars as to such times will be duly announced.

ERIC STUART BRUCE,
Honorary Secretary.

EXCELSIOR!

Excelsior is the cry of the Twentieth Century. This is evident, not only from the columns devoted to aëronautics in newspapers and journals, but from the fact that aëronautical illusion and discussion is wending its way so widely into the addresses and transactions of the meetings of the British Association for the advancement of science. At the recent meeting of the Association at Southport no less than three Presidents of different sections of the great parliament of science made graceful allusion to the work of the late Mr. James Glaisher, "the intrepid explorer of the upper air: the Nestor of meteorologists," as Dr. Shaw, the President of the Subsection of Astronomy and Meteorology, so fitly described him. The connection between aëronautics and meteorology was, indeed, emphasised in Dr. Shaw's lucid and suggestive discourse. Most especially did he call attention to the valuable work of Professor Hergesell in the organisation of the international investigation of the upper air by balloons and kites. It is in his opinion a department which offers a

most promising field for future meteorological efforts. "It may very well be that observations on the surface will never tell us enough to establish a meteorological entity that will be subject to mathematical treatment. It may be that we can only acquire a knowledge of the general circulation of the atmosphere by the study of the upper air, and must wait until Professor Hergesell has carried his international organisation so far that we can form some working idea therefrom of general meteorological processes."

In the Astronomical and Meteorological Department of Section A, the subjects of kites and ballons sondes were expounded by the most thoroughly representative authorities—Mr. W. H. Dines, Professor H. Hergesell, and Mr. A. Lawrence Rotch. It was pointed out by Mr. Dines that the novel means of research afforded by flying kites from steamers was not free from many difficulties. Some of these originated from the atmospherical conditions, some from want of sufficient speed in the steamer, others from the structure of the kite. With a speed of 12 knots kites have been raised to 6,600 feet, but with a speed of only eight miles the elevation was restricted to 3,000 feet. Strong and steady winds, and sufficient speed, though so necessary to good altitudes, were seldom obtained simultaneously. Out of 38 ascents only 20 gave good records.

Possibly it is the knowledge of these difficulties with the method of raising kites by artificial wind that induced Professor Hergesell to urge rather the adoption of a permanent kite station on these shores. Efforts are being made to establish such a station in Denmark, and from the beginning of the present year either balloons or kites have been sent up daily from Berlin. The results of these experiments were collected by the International Aëronautical Committee, and published at the expense of the German Government.

Speaking of the important work of the International Aëronautical Committee with ballons sondes, Professor Hergesell stated that the great difficulties had been to find suitable instruments. The greatest altitude so far had been obtained by M. Teisserenc de Bort, but it was expected that still greater heights would be reached by rubber balloons.

While speaking of these rubber ballons sondes it may be of interest to note that at the opening meeting of the new session of the Aëronautical Society of Great Britain will be exhibited one of the first English rubber ballons sondes which have ascended to an altitude of 20,000 metres, and which has been presented to the Society by Mr. P. Y. Alexander.

The remarks made by Mr. T. Lawrence Rotch, the Director of the Blue Hill Observatory, were very corroborative of the yearly-increasing value of kites in meteorological work. It is indeed to this indefatigable worker that we owe the idea of becoming independent of natural wind by using steamers for kite flights. Mr. Rotch exhibited at the meeting most valuable diagrams which embodied the observations obtained from 40 flights during 1900-2. It is important to note that marked inversions in temperature, accompanied by corresponding changes in humidity and wind velocity, were found to occur at all heights, and not only at the greater heights observed by aëronauts. We are told that an investigation of the decrease of temperature obtained in 20 kite flights at Blue Hill up to the extreme height of 13,000 ft., showed that while the mean decrease of temperature, computed by stages of 1,600 ft., was slightly greater in areas of low barometric pressure, there appeared to be no such diminution in the rate. This showed that for heights greater than 13,000 ft., the columns of air might be colder when the pressure at the ground was high than when it was low. In 1901 Mr. Rotch obtained records from the kite meteorograph in ten flights, the average of the highest points attained being 7,870 feet above sea level, and the greatest height being 12,500 feet. Speaking of the kite flights in co-operation with those organised by the International Committee, Mr. Rotch

mentioned that these were commenced in December, 1901. In 1902, thirteen flights were made, of which ten were upon the International days specified. In two cases the upper kites broke away, and were lost in the sea. Mr. Rotch estimates the height attained in one of these cases was 16,000 feet. The average height of the flights from which records were obtained was 7,940 feet; the maximum height, 14,000 feet. It was mentioned that the reason why flights were not made on all the International days was lack of wind on the ground, and that failure of the wind at higher levels limited the height reached at considerable altitudes. To raise kites on any day apparatus might be installed on a small steamer in Massachusetts Bay. Mr. Rotch claims that there is an important application for this latter method—the investigation of the meteorological conditions above the trade winds and doldrums. The theories in vogue as to the motion of the upper or anti-trades were not borne out by observations of the movements of volcanic dust and of upper clouds. Knowledge is also wanted concerning the depth of the trades, and about the vertical variations of temperature and humidity over the ocean; whether or no sudden changes in these elements occur between the trades and the anti-trades. It is Mr. Rotch's ambition to make atmospherical soundings with kites between the Azores and Ascension Islands, and for this purpose he is endeavouring to collect the necessary funds to charter and equip a steamer. Such a course would, in his opinion, be productive of the solution of some of the most important problems in meteorology and physical geography.

Regarding the progress made in navigating the air against the wind there was some reference made by Mr. Edward W. Brabrook in his Presidential address to the Section which dealt with Economic Science and Statistics. He stated that experimenters appeared to have advanced little beyond where we were 50 years ago, when, on September 24, 1852, Henri Giffard succeeded in driving a balloon for very short distances against the wind. We wish, indeed, that we could bring forward statistics to show that the advance during the period has been great. But though we must acknowledge the advance to be small, yet it must be pointed out that in the address of the President of the Section of Economic Science the facts of the small advance that has been made are hardly presented as they exist.

M. Henri Giffard, it is true, ascended on the date named in an elongated balloon, carrying steam engine and boiler with inverted chimney. There was, however, considerable wind blowing at the time of his experiment, and he did not attempt even short journeys against the wind, but contented himself with some circular movements and lateral deviations. He did not make a second attempt. The Brothers Tissandier, who next constructed a navigable balloon in 1803, did not attain any very definite result. It was Captains Krebs and Renard, in 1885, who first made definite return journeys against a wind of from 3 to 3·50 metres a second, and who, by means of maps, have recorded their aërial excursions. The history of all scientific progress commences with recorded figures and not on unsubstantiated statements. The history of navigable balloon return journeys must, therefore, start from the efforts of Captains Krebs and Renard, which makes the period of definite work with navigable balloons very considerably less than 50 years. Those who wish to study the actual advances made by M. Santos Dumont in 1901 will find an article on the subject in the last number of this journal.

A glance over the pages of the current number will show how eager modern aëronauts are becoming to eclipse the work of their predecessors in the matter of the navigable balloon, though to so many minds the combination of balloon and motor does not commend itself as the final solution of the problem of Aërial Navigation.

Though progress may be slow, it is the consolation of the aëronautical student to know that to one worker in the days of Giffard there are now hundreds. There

are, too, thousands of precedents that come to his mind to assure him that whether it is to be by the heavier than air, the lighter than air, or the same weight as air, the pressure of combined work and intelligence must one day overthrow the barrier to our knowledge of those laws which govern artificial flight.

The widespread interest now taken in aëronautics and its applications is one reward to the Society which has fostered the growth of the science in this country. At times in the past when there was depression in aëronautical doings, and when there was much scepticism and little encouragement, the Aëronautical Society of Great Britain, even if it only met annually in those times, still in those periodic meetings collected the essence of all real aëronautical progress and preserved it in the old annual reports.

At the present moment the Society may congratulate itself on the steadily growing membership evinced during the last few years, and most especially on the very marked increase of membership during the past session. But with greater interest in the subject comes wider scope of action, and consequently need of ampler funds wherewith to carry out our projects and ambitions. It is, therefore, desirable in the future to still further enlarge our membership. Increase of membership in every society must largely depend on the hearty co-operation of each individual member, who can put before his friends the advantages of such a society and the greater privileges that will ensue from an increased membership. That there is such a unity of action betwixt the members of the Aëronautical Society of Great Britain is evident from the many names of candidates proposed by the members. But to still further meet the needs of aëronautical developments let us unite again in the useful task, and before the thirty-ninth session has ended and we have taken upon ourselves the weight of forty years, let us have doubled even the last year's record of new membership!

The de Bradsky Airship.

A Short Account of its Development, and of the Causes that led to the Accident on October 13th, 1902.

By Baron v. Schneider.

By kind permission of Baron de Bradsky's widow, I am enabled to give an authentic account of his ideas concerning the "de Bradsky" balloon, of its construction, and of the causes that produced the lamentable accident on October 13th, 1902, in which Baron de Bradsky (Fig. 1) [to the left] and his engineer, Morin [to the right], lost their lives. Baroness de Bradsky thought it due to her husband's memory to have this account published, particularly as the details in the papers at the time of the accident were more or less incorrect, and none of their authors had grasped the fundamental idea which actuated Baron de Bradsky in the construction of his airship; Baroness de Bradsky was also of the opinion that a reliable account would be of interest to aëronauts in general, and might be of use in solving the numerous and difficult problems which assail them. Santos-Dumont's experiments had convinced the inventor that *this* system of airship was well-nigh perfect in its way, while at the same time raising doubts in his mind as to its being altogether the best. After carefully studying all his forerunners, investigations and experiments, he came to the conclusion that an airship in the real sense of the term ought to *raise itself* in the air by means of propellers with as little as possible aid from a balloon, and that one would gradually be enabled to dispense with the latter. His investigations were therefore directed in the following manner:—

1. To study the different sorts of propellers hitherto in use, and test their power of raising a balloon or any given weight. 2. To construct if necessary a new type of propeller, specially suited to the purpose in view. 3. To test the equilibrium of a balloon when raised in such a manner.

After some preliminary investigations as to the best shape for the balloon and the most reliable way of preventing deformation, the ordinary cigar-shape, *i.e.*, pointed at the prow but rounded at the helm, was adopted, with a wooden framework extending the whole length of the balloon, at one end of which the rudder was attached; this frame also supported the

car by means of wires or ropes, and just above it were fixed a pair of long fins, which could also be regulated from the car, and were intended to act as a parachute (Fig. 2.)

A balloon of this type was ordered from M. H. Lachambre, of Paris, in April, 1901, to be made of Japanese silk, and shortly after the design for a car 23 yds. long from Messrs. Risacher and Hebert; the capacity of the balloon was such as to bear two persons besides the driving machinery.

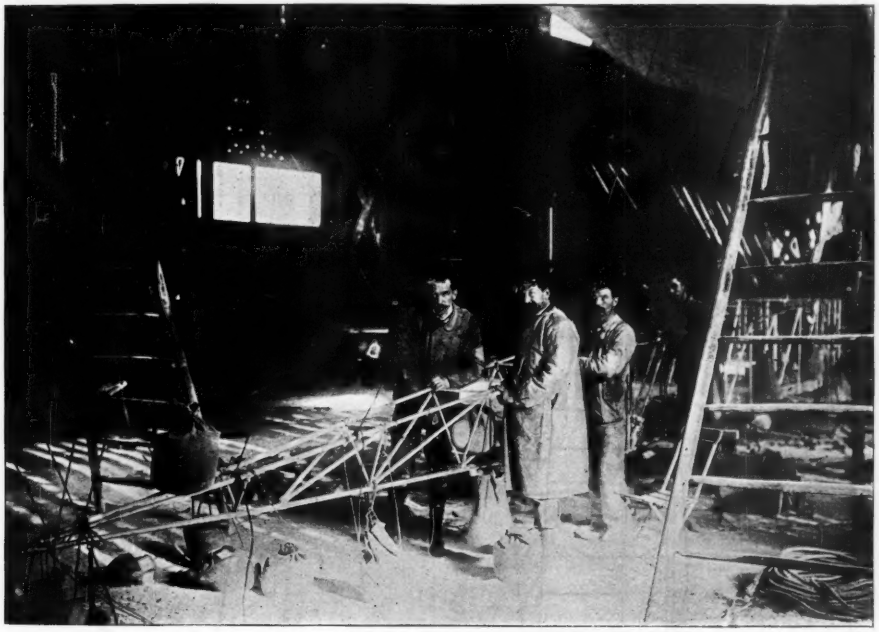
While these orders were being executed, the inventor began his trials with propellers. With

This type of propeller is generally built with two blades; however, de Bradsky also tried a greater number with marked success, as the following table of results indicates :—

Table of Results with Buttenstaedt propeller.

Diameter of blades, 2.62 *yds.*

No. of Blades.	No. of Revol.	Weight raised.	Angle to axis of rotation.
2 ..	442 ..	72·6 lbs. ..	45 deg.
3 ..	420 ..	96·8 ,, ..	45 ,,
4 ..	326 ..	68·2 ,, ..	45 ,,
4 ..	340 ..	72·6 ,, ..	45 ,,
4 ..	358 ..	79·2 ,, ..	45 ,,
4 ..	310 ..	96·8 lbs. ..	22 deg.
6 ..	190 ..	55·0 ,, ..	45 ,,
6 ..	224 ..	59·4 ,, ..	45 ,,
6 ..	276 ..	74·8 ,, ..	45 ,,
6 ..	350 ..	90·2 ,, ..	45 ,,
6 ..	164 ..	63·8 ,, ..	22·5 ,,
6 ..	214 ..	85·8 ,, ..	22·5 ,,
6 ..	260 ..	107·8 ,, ..	22·5 ,,
6 ..	284 ..	110·0 ,, ..	22·5 ,,
8 ..	156 ..	55·0 ,, ..	45 ,,



Baron de Bradsky.—M. Morin.

Fig. 1.—**The De Brasky Airship.**

out denying a certain measure of success to Santos-Dumont's propeller (Fig. 3), which has also been used by Count Zeppelin, the inventor thought that opinion was too much divided as to its most favourable proportions, as, in fact, the design employed by Count Zeppelin met with much criticism in France, while giving very good results. He accordingly first of all tried the so-called Buttenstaedt propeller, in combination with a 16 h.p. Buchet motor, the latter being fastened on a flying scaffold and the propeller fixed to a flywheel.

From these results, it is evident that the best effect was produced by a 6-bladed propeller in which the separate blades were placed at an

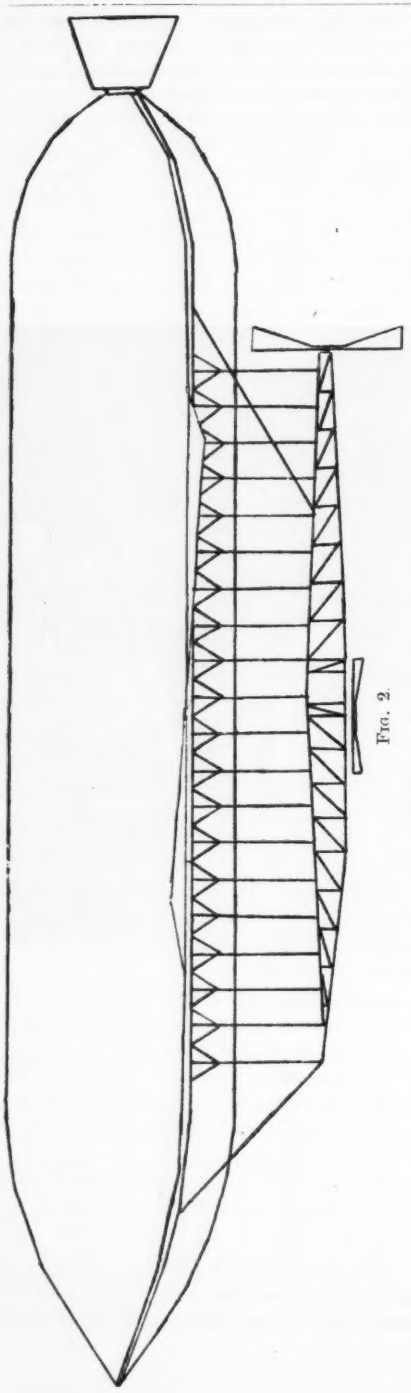


FIG. 2.

angle of 22·5 deg. to the plane of rotation. This induced the inventor to make some further trials with a sort of combination of the Santos-Dumont and Buttenstaedt propeller, which, however, were superseded by later investigations.

This work had proceeded so far when M. H. Lachambre was able to hand over the balloon to him (in the autumn of 1901), and Messrs. Risacher and Hebert produced the car. The former was immediately filled with gas and attached to the car, as the inventor was anxious to test them both, when, much to his regret, it appeared to him that the car was very badly made and utterly useless. The balloon, therefore, had to be stowed away for the winter, and further trials postponed to the spring.

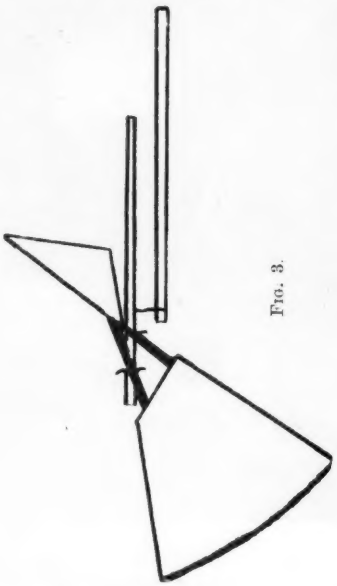


FIG. 3.

This enforced delay led the inventor to make some further experiments with propellers, and to develop an idea which had been growing on his mind. He had become convinced of the desirability of imitating the shape of a bird's wing in constructing the blades of propellers, instead of copying, to a certain extent, fishes' fins, as had hitherto been done. Birds' wings, however, are broadest at their base, whereas he constructed his blades widest at a point we will call the shock-centre, through which the resultant of the various forces acting on different points of the blade, as it turns, passes.

The subjoined illustrations (Figs. 4 and 5) and the photograph (Fig. 6) will explain his idea. Each propeller has two blades like Fig. 4 fixed on to the propeller-shaft, and composed of two

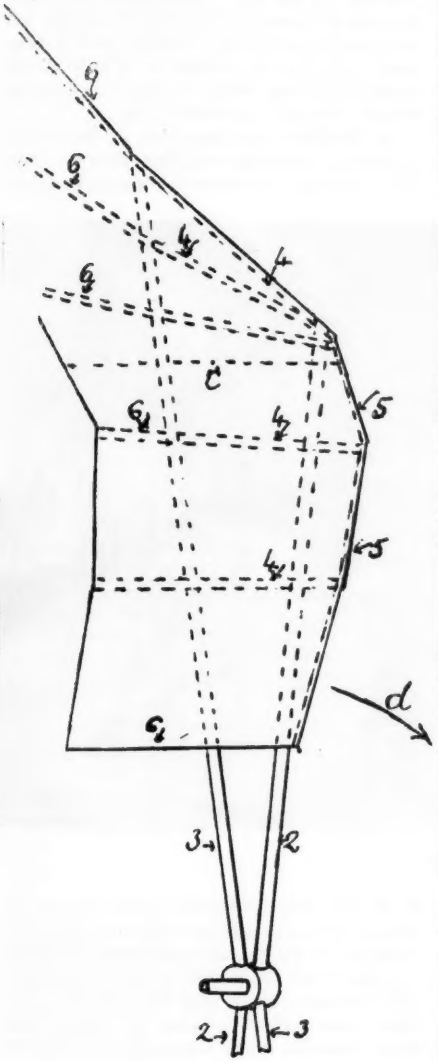


FIG. 4.

straight tubes (*2* and *3*) at an angle (*a*) of about 20 deg. to the plane of rotation (*x*). On these tubes are fixed cross pieces (*4*), and united to these the tubes (*5*), *2*, *3*, *4*, and *5* represent the *flat* surface of the blade and are rigid. The *flexible* part of the blade is composed of elastic rods (*6*), attached to the cross pieces (*4*), and forming when the blade is at rest an angle of about 40 deg. with the plane of the flat surface, and an angle of 60 deg. with the plane of rotation (*x*). The whole frame was covered with varnished silk, and it is easy to understand from the diagrams that when the blades rotated in the direction of the arrow (*d*), the angle (*b*) would diminish, and the curved part of the blade get flattened out.

In the spring of 1902, de Bradsky resumed his work in the shed where the balloon had been put up for the winter, and began by re-examining the state of the car. This seemed to him to have been so badly constructed that he decided to cut it up, and have it rebuilt by his own engineer, Morin.

Meanwhile, he had it repaired to a certain extent in order to test the new propellers, with which he obtained a raising power of 242 lbs. with blades of 4 yds. diameter and 198 lbs.

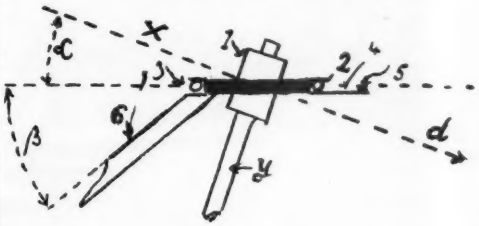


FIG. 5.

with blades of 2·62 yds. diameter at about 350 revolutions a minute; this was all the Buchet motor mentioned above could produce and pecuniary reasons restrained the inventor from getting a more powerful one. After testing the propellers, the inventor had the car cut up and reconstructed by his engineer, Morin. The frame for the aëronauts and motor was connected by steel tubes, and braced with wires and made rectangular in shape, terminating on each side in a triangular section; it was 19·14 yds. long, and rested on four feet in order to protect the horizontal screw underneath.

The motor drove two screws, a horizontal one and a vertical one, each of which had a clutch by which it was thrown on or off. The horizontal screw was placed under the car and intended to *raise* the latter and the balloon, but the vertical screw was fixed at the end of the car and propelled the latter in a horizontal direction; it is particularly important to note

that the screws were always used singly, and never at the same time.

The subjoined photograph (Fig. 7) shows the position of the motor in the car; to the left is the gasoline tank, and to the right the radiating tube and water reservoir. One great improvement was the arrangement of muffling tubes into which the exhaust gases escaped from the cylinders, and which consisted of sheet-iron tubes pierced with a number of small holes, as may be seen from the photograph; this arrangement radically prevented the flames of the exhaust gases from igniting any escaping

pleted, the inventor turned his attention to the balloon again, which, in the interval, had been fitted up with two partitions inside by M. Lachambre in order to prevent the so-called "rolling" of the gas. On weighing the silken covering he found, however, that the weight had increased from 275 lbs. to 396 lbs.; this necessitated enlarging the balloon by a strip of silk about 1 yard wide, which increased its capacity from 27,181 cb. ft. to 30,005 cb. ft.

De Bradsky next proceeded to fill it with hydrogen, beginning on September 22, 1902. For this purpose the balloon, which had a length

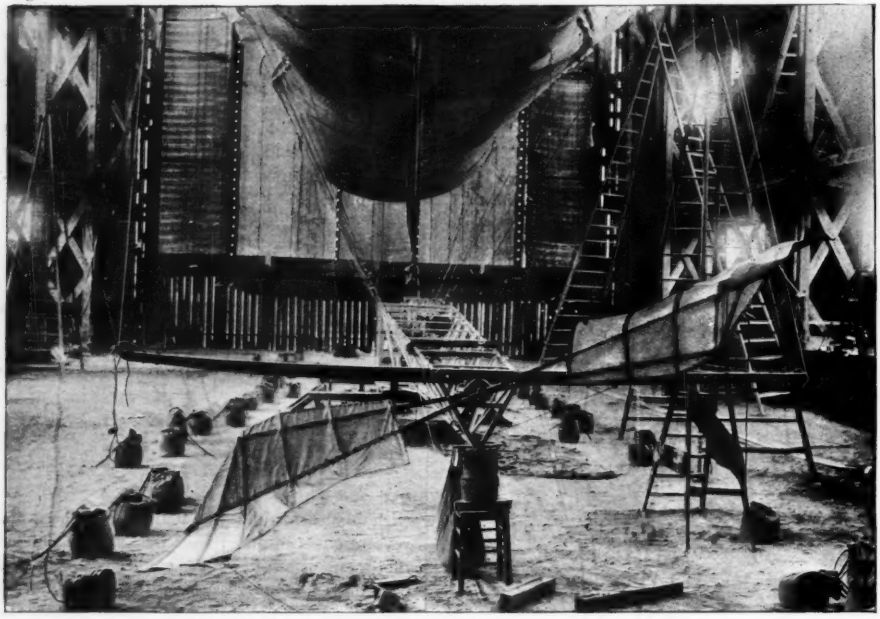


Fig. 6.

hydrogen from the balloon on the principle o the Davy safety lamp.

Special care was also devoted to the connection of the gasoline reservoir with the motor, this tube consisting of a particular sort of flexible rubber (Durit), as it is highly probable that the destruction of Severo's airship, "Pax," was due to the fracture of the *rigid* tube connecting these parts.

The electric battery and spark-break were also carefully enclosed to prevent accidents arising from that quarter.

As soon as the reconstruction of the car and fittin it up with machinery was fairly com-

of 37 yds., was brought into Severo's shed. As soon as the upper part had expanded under the influence of the gas, the framework mentioned on page 3 was attached to it, and the long fins, also referred to there, were fastened to it. The frame also served to fasten 50 ends of rope fixed crosswise, which communicated with the wires of the car.

After filling the balloon completely with hydrogen, the inventor began attaching the car to it, when he discovered that, owing to some change in the balloon's equilibrium, it got out of shape. This induced him to lengthen the car by 2·73 yds. to 22 yds. instead of 19·14 yds.,

which enabled him to gain a number of new points of contact between the balloon and car, besides fastening them together by means of ropes. In addition to these a hawser of 65·6 yds. was suspended as a guide rope from the prow of the balloon and one of 44 yds. to the same end of the car.

In calculating the size of the balloon, a raising power of 36·96 oz. for every 1·308 cb. yd. was provided for. The size of the balloon was 30,005 cb. ft. and the weight of the whole air-ship as follows :—

Car, motor, and driving machinery ..	809·6 lbs.
Two oil-reservoirs	41·8 ,,
Water and gasoline	39·6 ,,
Silk covering and valves	418·0 ,,
Wooden frame	132·0 ,,
Fins	33·0 ,,
Rudder	8·8 ,,
Suspending wires	13·2 ,,
Aëronauts	308·0 ,,
Hawsers and other ropes	110·0 ,,
Supports of the car	8·8 ,,
	1922·8 lbs.

The total weight being 1922·8 lbs., there remained a raising power of 39·6 lbs.

De Bradsky thought it a great advantage to have this extra raising power, as it enabled him to add a certain amount of ballast and to test the efficiency of the horizontal screw thereby. Accordingly he added 187 lbs. of ballast, which was distributed about the car, and then started the horizontal screw; under its action the balloon rose at the rate of half-a-yard per second to the height of 6·5 yds., when it had to be arrested to prevent it striking against the roof of the shed.

This success proved that the horizontal screw was capable of raising an over-weight in a most satisfactory manner, and the best results were anticipated when the balloon was brought into the open-air. This, however, had to be postponed till October 13, 1902, owing to bad weather.

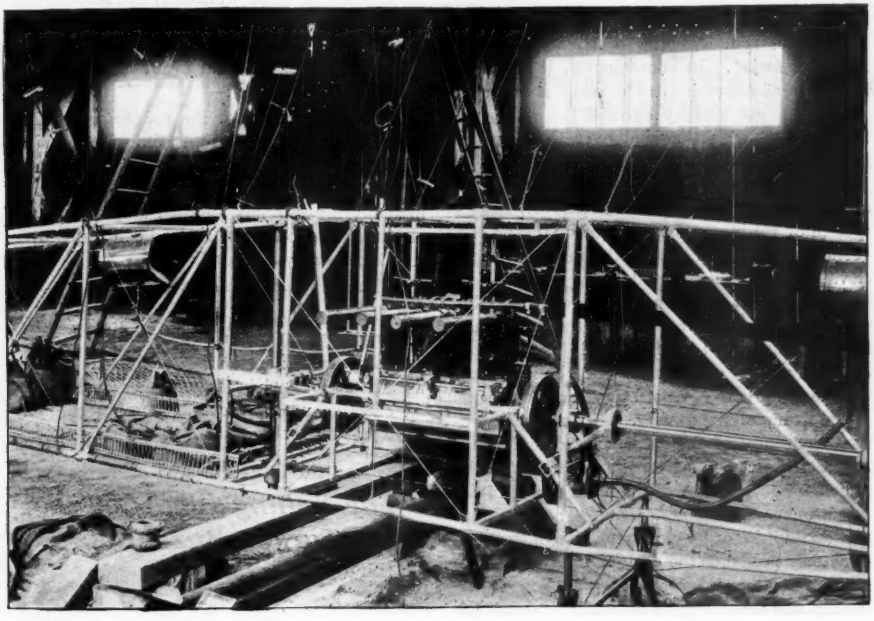


Fig. 7.

THE FATAL 13TH OCTOBER.

The weather having improved, the inventor started early for Vaugirard, where the air-ship was on that morning, and met his engineer, Morin, superintending the refilling with gas to make up for waste. On weighing the air-ship it appeared that there was a raising power of 66 lbs. To compensate this, 66 lbs. of sand in two bags were taken in

the car, and besides this 198 lbs. in six bags' and 17·6 pints of petroleum, making a total over-weight of 209 lbs. The balloon being already in the open air, they then started the horizontal screw, which caused it to ascend, its movements being further accelerated by throwing out two sandbags, and then the men below let go the hawsers, and the fatal voyage began. The inventor's wife had followed him to Vaugirard, where she saw him alive for the last time.

After ascending about 160 yds. the horizontal screw was stopped, and the vertical screw started; this induced the air-ship to move *forward*, but unfortunately the rudder was not powerful enough to keep it *against* the wind, because the rounded prow of the balloon hindered its action. In consequence, it appeared that the aëronauts, after making some vain attempts to get it to fly *against* the wind, had to let it drift with the wind over the City and in the direction of the Montmartre.

The ascent had hitherto proved that with the exception of the faulty rudder, de Bradsky's system of raising an over-weight by means of a vertical screw, and after attaining a certain elevation using a horizontal screw to move forward in a given direction, was a good idea; his wife, therefore, who was watching the transit, had no misgivings as to a favourable termination, especially as she heard the balloon had traversed Paris in a satisfactory manner.

Unfortunately, however, neither the aëronauts nor any of their friends had sufficiently considered a very important factor, which, as the issue showed, was one of the main causes of the catastrophe. Using a *horizontal* screw under the airship in order to raise the latter undoubtedly produced the desired effect, but at the same time it induced a *rotary* motion of the airship, and accordingly a torsional strain on the suspending wires; this strain would, of course, be all the more detrimental according to the resistance of the balloon to this rotary motion, and the violence of the wind.

The inventor had guarded against this fault to a certain extent by arranging that the steel wires which fastened the car to the balloon should end in pieces of rope, so that any torsional strain should affect the *ropes* and not the wires. This, however, does not seem to have been a sufficient safeguard. In addition, one of his workmen had fastened the wires with a *sharp* pair of tweezers, so that they were all indented, and the majority gave way just at these places.

When the balloon reached the neighbourhood of Globe de Stains, the aeronauts shouted to a carpenter below, a M. Aubert, who was watching them, asking him where they were, and in what direction they were flying? They then started the horizontal screw again and passed over a railway embankment. The next thing M. Aubert saw was Morin moving across to de Bradsky, and the airship tipping up in front, immediately the overstrained wires snapped and the car fell heavily to the ground, while the balloon rose with great rapidity and soon disappeared.

On approaching the scene of the disaster M. Aubert found both the aeronauts dead and entangled in the *débris* of the car. He had them removed by his workmen, and sent for the Prefect of Police, who saw them conveyed to their respective residences.

The causes of this sad event may be briefly summed up as follows:—

1. The *inefficiency* of the rudder, which prevented the aeronauts from going in any *premeditated* direction, and, in particular, not towards Issy les Moulineaux, where the manœuvring grounds afforded ample space for all sorts of evolutions, instead of drifting over the City as they did.

2. The *torsional* strain on the wires.

3. The *weakness* of the latter and their having been operated on with sharp tweezers.

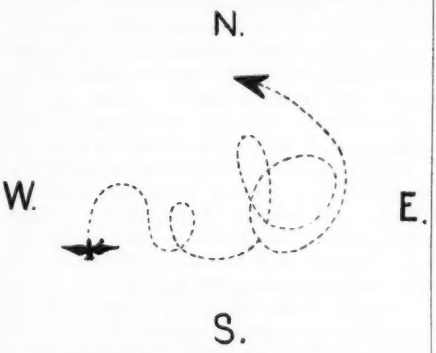
4. The neglect on the part of the aeronauts to use the *valves* when they wished to descend; an effective use of the latter might certainly have prevented the accident at the last moment.

The Sailing Flight of the Turkey-Buzzard.

By T. H. Hugo.

The central plain of Mexico is at a considerable elevation, ranging from 3,000 ft. at the frontier to 7,300 in the immediate neighbourhood of the City of Mexico. The air is, consequently, considerably rarefied, and one would suppose that birds would find it difficult to practise sailing and circling flight; but that does not seem to be the case, as, at any time during the day, numbers of turkey-buzzards can be seen sailing or floating and circling with only a rare flap of wing; and, as a proof that rarety of atmosphere does not seem to diminish their sailing powers, I have seen at Tres Marias, a station on the Cuemavaca line, as it crosses the hills bounding the southern limit of the plain, at an elevation of over 10,000, these birds sailing equally gracefully and without any appearance of labour. There

can be little doubt that the air at this elevation has less supporting power, and, therefore, it must be compensated for by the greater speed of the upward current, and shows how wonderfully adapted the wing of the turkey-buzzard is for sailing flight, and that at a lower elevation the wing could support more than the weight of the bird. Living mostly on carrion, it is known that they sometimes gorge themselves to such an extent that they can hardly fly, and it is, possibly, to provide their escape at such times that they are so well endowed with power of flight. The temperature over the plain increases till after mid-day, and up to that time there is rarely a breeze except for a fitful puff now and then; constant whirls of air are to be seen revolving, sometimes from right to left, other times in a contrary direction, spinning across the plain, and when crossing a road or ploughed field, carrying dust or leaves torn from the dried corn stalks to heights varying from 20 to perhaps 100 ft. Commencing with narrow and very rapid motion



the whirl broadens as it rises, till it loses the power to carry further the dried corn blades and withered grass, which return to the ground with many oscillations. The air, heated by contact with the sun-scorched plain, is rising, and this, perhaps, is the best time to study the sailing powers of the turkey-buzzard, when many are to be seen floating over the fields at all heights, and when low, generally with wings much elevated, and this in an atmosphere which, to the senses, appears an oppressive calm. During these hours they give one the impression that they float about much as a cork does on a wave, that it requires no ingenuity. There is none of that constant adapting the wing to the varying pulses of air that is seen later on when the breeze springs up; but with wings constantly outstretched, the impression is of rest, not of toil, so graceful and so uniform is the motion. Sometimes they will seek the shade of a cactus, where they lie with bill open, giving the opportunity of seeing them alight, and it is evident that to do so requires exertion; as with wings right over their backs they sink but slowly, and sometimes, as if impatient with their slow progress downwards, they lower their wings and close them. This manœuvre always filled me with envy, the difficulty being to descend. Between 12 and 1 a breeze springs up, generally, and continues till 4 or 5; at times the wind increases to a half gale, but the buzzards do not cease sailing about, though, generally, at a higher elevation. Rocking in the fresh breeze they hold the wings in quite a different manner; these are much arched, not lying horizontally but with a varying angle to the wind and the primaries sharply bent upwards, and there is a constant adjustment to the force and direction of the wind waves. I was anxious to settle the question, *i.e.*, "the path of the current striking a sailing wing," which I had formerly tried to solve by causing smoke to be borne by the wind against a dried wing. The smoke seemed to sweep over the upper surface, leaving it before reaching the last row of coverts, and had an inclination to curl towards the tip of the wing; on striking the under surface it had the tendency to be swept towards the shoulder. I expected that if the current ran along the under surface from primaries to shoulder, it escaped by raising the feathers adjoining the body, which are very weak; and to get a close under view of the birds, I have lain down in an open spot, which seemed to attract the buzzards, and they have sailed over me at a not greater height, perhaps, than 10 ft., viewing me intently, but I could detect neither a raising or vibration of these feathers; the wing looked as solid as if cast in bronze. These vultures are often to be seen circling in great spirals, and at times the lower half going from right to left, while the upper half were circling in a contrary direction, and they do not seem to be influenced by the direction of the whirls of air, as, on February 9th, I made the following note (and re-marked it several times afterwards): "11 a.m., wind very light, south-easterly, birds circling from right to left, the majority of whirls in a contrary direction." The path of the circling bird is complicated, and having traced it several times I give the following as an example: I timed the periods that I have observed the turkey-buzzard sail without flap of wing to be 4, 5, and 10 minutes on different occasions, and then it was not that the birds

commenced to flap, but that they had been carried out of my view by rounding the side of a hill or floating away over the plain. Nothing strikes one so forcibly in watching these birds as the case they evince, the absence of all apparent exertion, and one must believe that it does not demand much muscular power, perhaps not much more than in keeping one's arm fully supported by lying on a desk or table, outstretched. In a climate like Mexico, and the favourable atmospheric conditions found there, *i.e.*, the regularity of a large mass of air rising, one would be led to think that with a properly constructed surface, persistence, and a stout heart to learn sailing, flight might be looked upon as a possibility.

New British Airships.

We are indebted to the inventors of the two airships of British make now attracting attention for the following details of their construction:—

1.—The Spencer Airship.

In form the airship consists of a fusiform gas-vessel supporting a triangular braced keel or framework which contains the motor, mechanism, and voyagers.

The gas vessel is 93 feet long and 24 feet maximum diameter, and has a capacity of 30,000 cubic feet.

It is made of the closely-woven silken fabric used for Messrs. Spencer's ordinary Passenger Balloons, varnished several times inside and outside to render it impervious to hydrogen gas. It is fitted with a "ripping valve," by means of which the gas may be speedily released, inlet tubes (for inflating it with hydrogen and for pumping in air), and an automatic valve which relieves any undue pressure before the bursting point of the fabric is reached. Running horizontally round the gas vessel, and securely fixed to it, is a sailcloth band which supports the pendant weight. This horizontal band also forms a safeguard by assuring that the gas vessel shall take the form of a parachute in any contingency.

The framework or keel hangs 12 feet below the gas vessel, is of bamboo construction, stayed with steel wires, and measures 50 feet long.

It carries in front the 12-foot diameter screw propeller or "tractor" on a steel shaft which is supported by ball bearings and runs through gear-wheels and a clutch to the motor.

The Simms petrol motor is situated in the forward part of the framework, and is of 24 h.-p. It is fitted with magneto ignition, has 4 cylinders, mechanically operated inlet valves and throttle governor. It develops its power when running at a speed of 1,050 revolutions, and this speed is reduced by the gearing to 300 revolutions per minute, at which the "tractor" revolves.

The exhaust box of the engine is covered with wire gauze, on the Davy Safety Lamp principle, to guard against ignition should any gas fumes approach it.

Situated centrally on the framework are two brass containers, the first of which holds the water for cooling the engine, which is caused to circulate through a radiator and over the cylinders by means of a centrifugal pump working on the flywheel; and the second the five gallons of petrol which forms the fuel for the motor.

In the rear part of the framework is the car, in which the aëronaut takes his position and from which he has control of the motor and the clutch by means of levers actuating wires on the E. M. Bowden's patent system. He also has ropes from the rudder (which is suspended at the rear end of the framework), which enable him thereby to direct the course of the airship to the right or left as desired. He can vary the altitude in two manners: first, by means of a balance rope, which enables him to point the airship upwards or downwards, according to whether it is desired to proceed higher or lower; and secondly, by means of a hand-blower, which enables him to pump air into the gas container, and thus cause it to descend by the increase of its specific gravity.

Ballast is also carried to enable a higher altitude to be reached if desired.

2.—Dr. Barton's Airship.

Dimensions of Shed.—75 ft. high, 55 ft. wide, 182 ft. long.

Details of Airship.—The balloon is made of Tussore silk, 170ft. long, 40ft. diameter. The major part of the balloon is cylindrical in formation, the nose being ogeve, the stern slightly spherical. It is divided into three compartments by flexible diaphragms; the total capacity —230,000 cubic feet. In the centre compartment is an internal air-ballonet, capable of being expanded to 17,000 cubic ft. The balloon is fitted with three automatic and four voluntary valves; the outer covering is made of unvarnished Tussore silk, strengthened every nine inches by webbing bands. The nose of the balloon is also strengthened by bamboos radiating from the centre. These are contained

in double seams in the outer covering. There is also a split bamboo, 2½ inches wide running completely round the Equator of the balloon.

The leading lines are made of tanned Italian hemp, from the edge of the outer covering to the upper longitudinal aëroplane frame, and are placed at intervals of every 18 inches. From that to the keel there is a wire cable, the latter being collected in the shape of a fan, so as to pass under the crutch of each of the large bamboos which form the main triangles of the car.

Dimensions of Ship.

Length from bow to end of rudder ...	140 ft.
Height of bamboo framework ...	18 ,,
Width	16½ ,,
Length of deck	133 ,,
Width of deck	7 ,,
Width of flying-bridges	15 in.
Height of hand-rail ...	4 ft. above deck.
Total height (from keel to top of balloon)	60 ft.
Width of aëroplane frames ...	30 ,,

Number of aëroplanes—30 (arranged in three series in front of each of the three motors, five on each side of the flying-bridge.)

Dimensions of each aëroplane—13 ft. 6 in. × 3 ft.

Engines.—Three in number, 50-horse power each, Buchet petrol motors, electric ignition, automatically governed; 1,600 revolutions per minute (can be accelerated up to 1,800), fitted with Longuemare carburettor, and silencer fitted with diaphragms, and covered with two layers of Davy gauze. The engines are cooled by means of Clarkson radiators, the pump for circulating water being of Panhard type, driven off the flywheel.

Drive.—Clutch, pinion, two-toothed wheels, two belt-pulleys, belt to two corresponding belt-pulleys on steel propeller shaft, reducing revolutions of propeller to 250 per minute.

Weight of Motor	305 lbs.
Fly-wheel	112 ,,
Weight of gearing	500 ,,
Weight of each propeller and shaft	260 ,,

Propellers.—Six in number, arranged laterally, one on each side of each motor, which work independently. The propellers are Mangin type, six blades each, 12 ft. in diameter.

Estimated thrust—3,000 lbs., peripheral speed of propeller, 1½ miles per minute.

Balancing Apparatus.—Two water tanks, capable of holding 50 gallons each, are placed on the extreme bow and stern of the deck. These are connected by pipes to a motor-driven centrifugal pump, which can be governed either by hand or automatically by the Barton-Walker electrical equipoise.

The rudder is 20 ft. high × 12 ft. long, and is on the balanced principle, being pivoted 2/5ths from the front edge.

The rudder and propellers are made of tubular steel, covered with a double layer of strong varnished fabric.

The helmsman is in telegraphic communication, on the Bowden-Brake principle, with each of the motor engineers.

The crew will consist of seven—three engineers, helmsman, aëronaut, balancing-pump engineer, and captain.

Total Estimated Weight of airship, crew, water, petrol, &c.—15,700 lbs. (approximately, tons.)

The St. Louis Exhibition.

The Aëronautical Society of Great Britain has received from the Royal Commission particulars concerning the classes of aëronautical exhibits—(Group 77).

Aërial navigation will form a portion of the department which deals with transportation (Department G).

Class 481:—Balloon construction; fabrics, varnishes, cars, valves, netting, cordage, appliances for stopping balloons, anchors, grapnels, generation of hydrogen, and of other light gases. Captive balloons.

Class 482:—Aërial voyages; use of balloons for the study of the atmosphere, air currents, clouds, temperature at great height, optical phenomena, etc., drawings, maps of journeys, diagrams, photographs.

Class 483:—Military ballooning; military captive balloons and their accessories, winding drums, transport waggons, apparatus for inflation.

Class 484:—Aërial navigation; dirigible balloons and guiding apparatus, flying machines, screw propellers, aëroplanes, and parachutes.

The Society has also received the supplementary rules relating to aëronautic competitions, issued August, 1903. These deal with additional prizes for balloon contests, and are as follows:—

In addition to the prizes heretofore announced for the Aëronautic Competition, the Universal Exposition offers the following prizes, open to all approved competitors, for a series of ten contests or balloon races between

mounted spherical balloons, to take place during the Exposition.

(a) Such contests shall take place on the first and third Monday of each month, beginning May, 1904. Additional or postponed races may take place in October.

(b) Such contests shall start from the Exposition grounds, and the prizes for the races will be awarded to the aëronauts landing nearest to a designated goal to be selected by the judges a short time before the start is made, in view of the then prevailing wind, and at a distance of 20 to 30 miles.

(c) The race prizes shall be as follows:—

1st prize—$200, and a silver gilt medal.
2nd prize—$100, and a silver medal.
3rd prize—$50, and a bronze medal.

These shall apply to each race, as hereinafter limited. For the whole series of ten or more contests there will be in addition:—

One 1st prize $50 for the best report of a voyage.
One 2nd prize $25 for the next best report.
One 1st prize $50 and one 2nd prize $25 for the first and second best set of photographs taken in such voyages.

The reports and photographs to remain the property of the Exposition, and to be exhibited.

(d) When ten or more aëronauts participate in such a race, all three prizes shall be awarded. When six participate, only the first two prizes shall be awarded, and when only three participate, only the first prize shall be awarded. If less than three competitors present themselves, the judges may postpone or suppress the contest. When more than ten competitors present themselves, the judges may divide them into two sections, and require one of these to compete on a subsequent day, on which occasion it will be entitled to prizes.

(e) The Exposition management will furnish, free of charge, a shed, closed on three sides, to be 100 feet long, 80 feet wide, and 80 feet high, to store, test, examine, and repair the balloons of the contestants. It will be provided with suitable workshops, laboratories, and storage rooms. An expert will also be in attendance, to make repairs at a schedule of prices to be fixed by the management.

(f) The Exposition management will furnish, free of charge, suitable coal-gas to inflate the balloons, and sand to serve as ballast. It will also reimburse the actual reasonable expenses of the contestants back from the designated goal to the Exposition grounds, and it will protect the foreign contestants against any Customs charges upon their material for landing outside of the Exposition grounds.

(g) The contestants will be free to carry passengers, but the return expenses of the latter will not be paid by the Exposition.

In order to equalize conditions between balloons of different sizes, each will be handicapped in the amount of ballast which may be spent in reaching the goal. Such handicap shall be at the rate of 15 pounds per 1,000 cubic feet of the capacity of the balloon. This shall be delivered to the contestant in unsealed bags. The balance of the ballast required to equilibrate the balloon, while leaving it sufficient ascending power to depart, under the wind conditions then prevailing, shall be delivered to the contestant in sealed bags, to be brought back and returned by him in like condition. The judges will prescribe proper safeguards to prevent evasions of this rule.

(h) The sufficient strength and condition of each of the balloons shall be established in advance by the judges, who will in the main apply the rules and methods formulated for the Aëronautical contests at the French Exposition of 1900. The judges may rule out such of the balloons as do not comply with such conditions, but from their decision appeal may be taken to the International Jury, from whose decision there shall be no appeal.

(i) The judges will draw up rules to govern the details of these contests. They may, in consultation with the contestants, modify the conditions for some of these races, such as substituting the longest distance travelled—in, say, two hours—for the landing nearest to a designated goal; availing of contrary air currents to return nearest to the Exposition grounds, etc., etc. Races may be postponed or suppressed in case of bad weather, and additional prizes may be awarded by the judges in case of very meritorious performances.

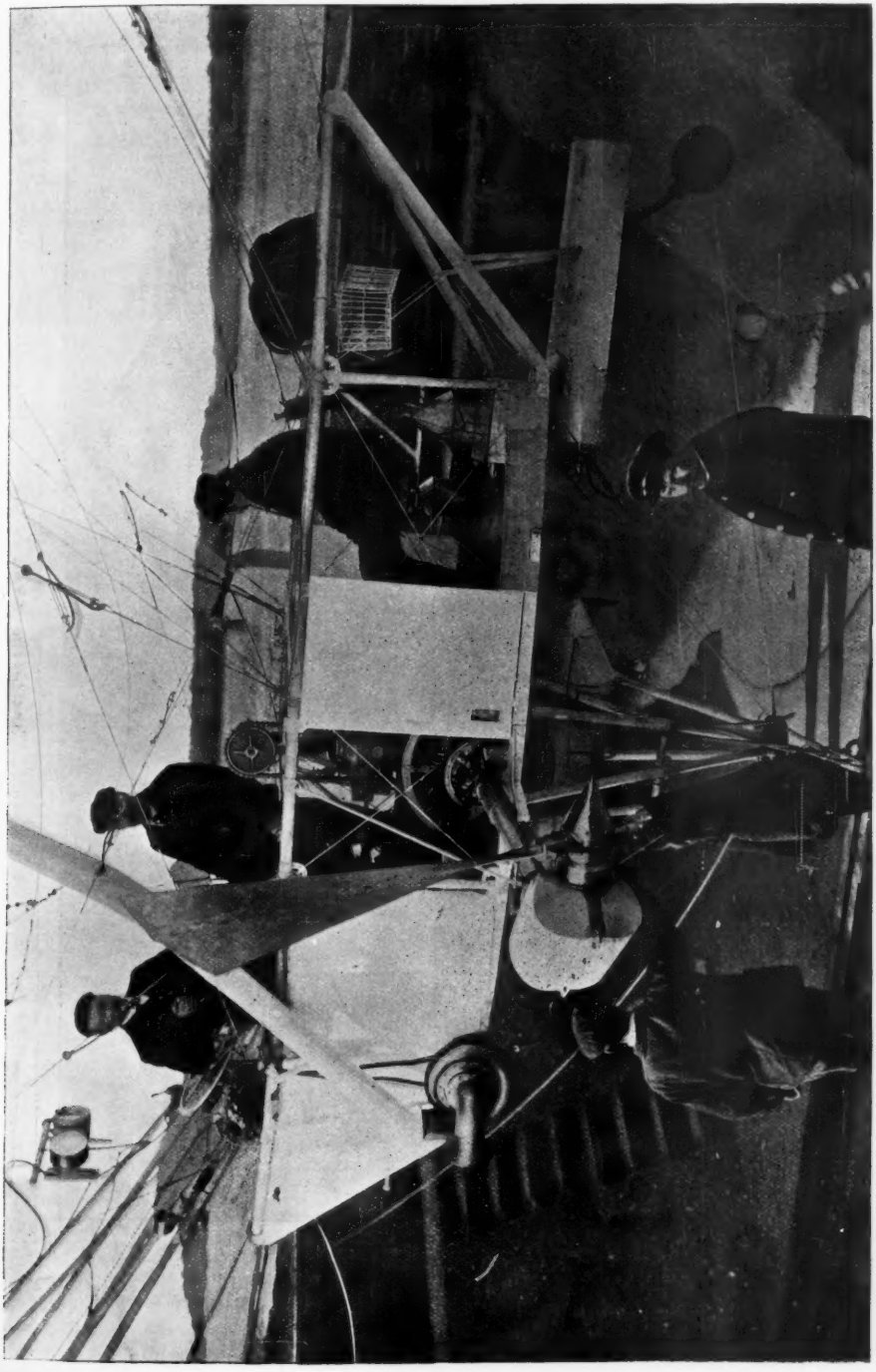
(j) The prize in Section IV. of the Rules and regulations heretofore issued, viz:—

"(a) For the greatest altitude attained, starting from the Exposition grounds,"

is hereby withdrawn, upon representations from foreign aëronauts that the performance is too hazardous.

The Lebaudy Airship.

By the kind permission of the editor of the *Illustrated Scientific News* we are able to reprint some views of the Lebaudy airship, to which we have already referred in this journal. In the September number of the *Illustrated Scientific News* will be found a descriptive



The Car of the Lebaudy Airship.

[By permission of "Illustrated Scientific News."

Inside the Shed. [By permission of "Illustrated Scientific News."

article on the Lebaudy navigable balloon, from the pen of Major B. Baden-Powell, to which readers of this journal may well refer. In the opinion of the writer the Lebaudy airship is "probably the most successful aërial machine ever made." It is distinctly original in many important details. The balloon, which has a gas capacity of 80,000 cubic feet, like its predecessors, is elongated, being pointed at both ends. The long frame-work supporting machinery and car, conspicuous in the constructions of M. Santos Dumont and others, is, however, abolished. The lower surface of the balloon is flat, and there is a frame of steel tubing surrounding this portion. The car is a steel frame partly covered with canvas, and is in the form of a boat. This is attached to the gas envelope by steel wire ropes. From the steel frame surrounding the flat bottom of the balloon six steel tubes run diagonally down to the car to convey the thrust of the propellers to the balloon. The engine is 40-horse power. The propellers are small, being only 2.44 m. in diameter, but they rotate at the high speed of 1,000 turns per minute. They each consist of a steel bar to which is fixed a thin plate of steel of a width equal to 1-10th of the circumference.

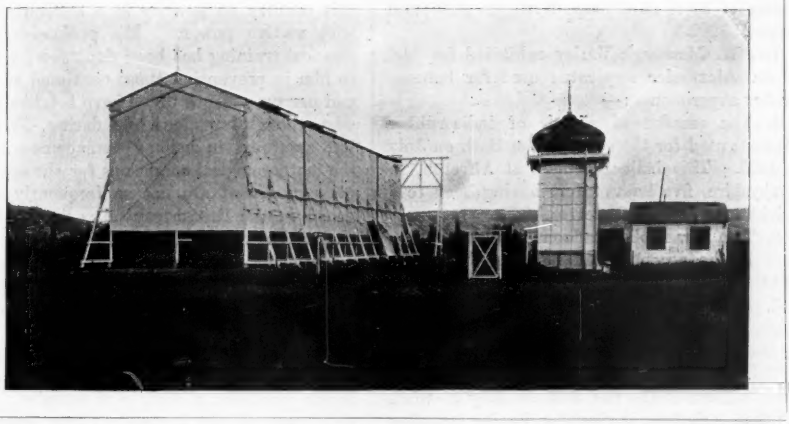
In reference to the construction of this airship Major Baden-Powell mentions that it is surprising how strongly and solidly the parts of the airship are made. Nothing is made of aluminium, steel being exclusively employed.

It is stated that the airship has already made twenty-nine journeys, twenty-eight of which have been return ones.

NOTES.

Cross-Sea Ballooning.— In the *Yachting World* Mr. Griffith Brewer has lately proposed a scheme for enabling a balloon travelling over the sea to be steered to the right or left from the direction of travel of the wind. He proposes that there should be a float somewhat in the form of a Whitehead torpedo to be immersed in the water and drawn behind the balloon by means of a rope. He thinks that such a float could be controlled from the car of a balloon by the use of electrically operated steering gear, which could be actuated through a twin insulated cable by an electric current from the car. The float would be provided with radially projecting plates or fins extending longitudinally for the purpose of preventing lateral slip when being directed to the right or left, and it would drag the balloon away from the direct line of travel of the wind.

Mr. Brewer has made two preliminary experiments with a small captive balloon of 500 cubic feet capacity, with which, on a second occasion, he succeeded in towing a sailing canoe up the circuitous course of the Thames from Teddington Weir to Long Ditton, a distance of four miles. The only means of steering the balloon was the rudder on the canoe.



By permission of] **The Lebaudy Shed.** ["*Illustrated Scientific News.*"

The Aëronautical Exhibits in the Meteorological Exhibition at the Southport Meeting of the British Association.—In connection with the meeting of the International Meteorological Committee at the meeting of the British Associa-

tion at Southport, there was an excellent exhibition of instruments connected with meteorology and terrestrial magnetism. No meteorological exhibition could be called complete at the present time if it did not contain some representation of the modern methods of investigating the upper air by kites and ballons-sondes. The organisers of the Southport Exhibition had, however, taken care that there should be no such omission. Mr. A. Lawrence Rotch exhibited photographs of kites and apparatus used at Blue Hill Observatory since 1894 for exploring the air, drawings showing details of kites and of the meteorographs carried by them now in use at Blue Hill, and a diagram showing the changes in the meteorological elements with height during 45 kite ascents, 1900-02.

Mr. W. H. Dines exhibited charts obtained from self-recording instruments sent up by means of kites at Crinan, N.B., in July and August, 1902.

Dr. W. Mansergh Varley exhibited for Mr. P Y. Alexander apparatus used for ballons-sondes experiments:—

1. The smaller of a pair of india-rubber balloons used for the ascent from Bath on July 2, 1903. This balloon landed at Alfreton, in Derbyshire, five hours later, having been to a height of over 20,000 metres.

2. Two new rubber balloons similar to those used in the ascents from Bath, made by the Continental Gutta-Percha Company of Hanover.

3. Barothermograph for sounding balloon work, of Professor Hugessell's pattern, made by Bosch, of Strasburg.

This instrument has already made two ascents from Bath, the first on July 2, when it fell at Alfreton, Derbyshire, having travelled 126 miles in five hours, and attained a height of over 20,000 metres, and the second on August 6, when it fell at Eccke, on the Franco-Belgian frontier, having travelled 229 miles in three hours, and attained a height of 13,700 metres.

4. Record obtained for the ascent from Bath on June 4, 1903. The balloon fell in the sea and the records are somewhat damaged by water.

5. Record obtained for the ascent from Bath on July 2, 1903.

6. Record obtained for the ascent from Bath on August 6, 1903.

Messrs. Newton and Co. contributed an altimeter for registering the height to which kites and other aërial machines ascend.

Mr. Stanley Spencer's recent Navigable Balloon Journey.—Mr. Stanley Spencer recently attempted to round the dome of St. Paul's Cathedral in the navigable balloon which is described in full in another part of this journal, but, owing to the meteorological conditions, could not carry out his programme, which had attracted thousands to the roofs in the neighbourhood of the dome. The failure was an object-lesson in the present limits of the system, which combines motors and propellers with a bag of gas that is lighter than air. On the occasion of Mr. Stanley Spencer's recent attempt he left the Palace grounds about 5 p.m. and reached St. Paul's in half an hour, but when he attempted to round the dome the wind-force overcame the propellers, and in vain did he try to demonstrate the steering powers of his machine. Mr. Stanley Spencer may, however, be congratulated on his continued efforts to show that the British nation does not intend to be behindhand in the matter of navigable balloons, and it must always be remembered that he has been the first man in this country to journey in a balloon supplied with motive power. His professional aëronautical training has been doubtless of service to him in preventing those continual accidents and narrow escapes which have befallen others, who, though ingenious and daring, have been but amateurs in balloon management. It is the meteorological conditions for the success of his experiment are not so frequently experienced in the British capital as in the French one, and certainly the conditions of the calms essential for navigable balloon return journeys have been very muc in the minority during the fitful, when not tempestuous summer of the present year. The attempted feat of rounding the dome of St. Paul's is not an impossible one, even in our insular climate. After all it is *par excellence*, a climate of samples. If the right sort of day is awaited long enough, it must come at last.

M. Santos Dumont's Present to the French Government.—Just when the aëronautical world was awaiting with eager expectation M. Santos Dumont's promised experiment in his omnibus balloon, he took its breath away by presenting his navigable balloons to the French Government. The cause of thus enriching the resources of the French Army appear to have been the result of M. Santos Dumont's manœuvres in his airship above the Review ground at Longchamps on July 14. On this occasion the Brazilian aëronaut saluted the President of the Republic from mid-air by firing revolver shots. It has been stated that it was the reception given to M. Santos Dumont on that day which so touched his heart as to make him determnie to repay the nation which had taken so keen an interest in

his work by the gift of his world-famed aircrafts.

Aëronautical Exhibitions.—In connection with a collection of aëronautical apparatus on view at the Alexandra Palace, it has been stated that it is the first attempt at an aëronautical exhibition in this country since 1868, when the Aëronautical Society of Great Britain inaugurated their exhibition at the Crystal Palace. This, however, is not an historical fact. For instance, in 1885, in days when exhibitions were still organised with premeditated care, and had, on that account, a real scientific value, the Aëronautical Society of Great Britain, in conjunction with the executive of the Alexandra Palace, carried out an exhibition. At this exhibition the jurors were Professor H. S. Hele-Shaw, C.E., Mr. H. Tingle A.I.C.E., Mr. E. A. Barry. There were nine classes in this Exhibition and it included models for the accomplishment of aërial navigation by mechanical means only, models for attaining the same object by mechanical means and buoyancy combined, light motors, models of navigable balloons, balloon materials and appliances for propulsion, miscellaneous objects of interest connected with aëronautics, instruments of measurement, relics, photographs taken from balloons, meteorological instruments suitable for balloon ascents. There were balloon races at this Exhibition, foreshadowing the already historic balloon competitions at Vincennes. In connection with this Exhibition the official report said "it would be hard to surpass the ingenuity and perseverence displayed by most of the exhibitors." To pass to later times, not three years ago there was an aëronautical section at the Naval and Military Exhibition at the Crystal Palace, when the management called in the assistance of both the Government and the Aëronautical Society of Great Britain. Amongst the exhibits were two balloons difficult indeed to surpass in their historic value. One was the shell-pierced balloon which ascended during the siege of Ladysmith, whose occupants directed the fire of the British artillery and did more for the defence of our Empire than has been generally supposed. The other was the historic balloon. "La Volta," in which the great French astronomer, M. Janssen, made his escape from the beleaguered capital of France to go on an astronomical expedition at the time of the Franco-Prussian War.

Count Henri de La Vaulx's Balloon Journey from Paris to Hull.—Count Henri de la Vaulx ascended in a balloon on Saturday afternoon at St. Cloud and crossed the English Channel at its upper portion. The wind was light from the south-south-east at the start, and during the passage. The descent was made near Hull.

Professor Langley's Airship Model.—The *New York Herald* lately gave an illustrated account of the launching of Professor Langley's twelve-foot model from the top of the Langley house-boat at Widewater. It appears that it flew a distance of six hundred yards, and then sank in twenty-two feet of water. It was, however, rescued, though, after its immersion, it is described as a tangled wreck of twisted wire and silk wings. The time of the flight is stated to have been 45 seconds. Its course in the air was in a semi-circle. The airship was driven by an 8-horse power naphtha motor, connected with two two-bladed propellers on each side of the machine, and one four-bladed wind vane rudder immediately behind the engine in an upright position, just behind this being the rudder proper. The airship was supported by a pair of white silk wings on each side 4½ feet in length by 2 feet in width. The propellers were on the side between the wings, revolving towards each other. The wings, steering apparatus, motor, and other running gear were attached to a central cylindrical tube of aluminium 18 inches in length and 5 inches in diameter.

Foreign Aëronautical Periodicals.

(In this list a selection of some of the most notable articles is given.)

L'AÉRONAUTE (Paris).

May, 1903.—"Ascension du ballon le Galilée le 4 Novembre, 1870" M. Hurson.

July.—Ascension du 14 Juillet; les prix obtenus; récit du voyage de L'Archiméde; M. Blanchet.

August.—Lettre de M. Wenz sur les Cerf-volants.

L'AÉROPHILE (Paris).

April, 1903.—Portraits d'Aéronautes contemporains: Claude Jobet; A. de Masfraud. L'Aéronat Lebaudy.

ILLUSTRIRTE AËRONAUTISCHE MITTHEILUNGEN (Strassburg).

April, 1903.—Die Luftschiffahrt in Japan von H. W. L. Moedebeck.

May.—Neues zur Katastrophe Bradsky.

June.—Winddruckmesser von H. R. v. L.

July.—Hargraves neuere Versuche.—

August.—Wiederholte erlaüterung des Schwebefluges.—Neuer erfolg des Luftschiffes

von Lebaudy.—Uber den Mediterraneen des Grafen de la Vaulx.

September. — Joseph Maximilian Freiherr v Lütgendorf, de erste deutsche Luftschiffer, von Max Leher-Augsburg.

WIENER LUFTSCHIFFER-ZEITUNG (Vienna).

April, 1903.—Hauptmann Josef Frib.—Die Ballonphotographie.

May.—Graf de la Vaulx.—Die Gleitversuche der Brüder Wright.

June.—Der Ballon Lebaudy.—Uber Gleitmaschinen.—Zur Lufthügelauftriebstheorie.

July.—Die neue sensationsfahrt des Wiener Aëro-klubs.—Vademekum zür erfinder.—Die Hebeschraube.

August. — Die erste Nachtfahrt, 1903; Hubert Silberer.

September. — Eine solo-Nachtfahrt im "Saturn"; Hubert Silberer.-Uber experimentelle Luftstauhügel.

L'AERONAUTIQUE BELGE (Brussels).

May, 1903.—Traversée de l'Atlantique en Ballon.

July. — Les Combustions spontanées de Ballons.

September.—La Résistance de l'Aer. — La Théorie du Cerf-volant.

Notable Articles.

1903.

Apl. 4. *Daily Graphic.*—"Colonel Cody's Kites" (Illustrated.)
— *Weekly Budget.*—"Sounding the Aërial Ocean."
20. *Daily Mail.*—"Aëronaut's Wild Flight."
May — *Review of Reviews.*—"When Shall We Fly?"
19. *Manchester Guardian.*—"The Science of Kite Flying."
23. *The Sphere.*—"The Kite in Modern Warfare." (Illustrated.)
29. *Engineer.*—"The Soaring Plane by a Short Method."
June 15. *Daily Telegraph.* — "Racing and Air Flights."
17. *The Sketch.*—"Inside an Airship Factory."
18. *Daily Telegraph.*—"The Ballooning Adventure."
24. *Daily Telegraph.* — "Santos Dumont's Airship."
25. *Echo.*—"Kites."
26. *Daily News.*—"Scientific Kite Flying."
— *Daily Chronicle.*—"Kite Flying."
— *Morning Advertiser.*—"Kite Flyir g on the Sussex Downs."
— *Evening News.*—"Battle of the Kites."
29. *Morning Leader.*—"The Flotilla of Kites."
31. *Daily Chronicle.* — "Atmospherical Research."
July 2. *Nature.*—"The Kite Competition of the Aëronautical Society."
4. *Illustrated Mail.*—"Striking Experiments by Scientific Kite Flyers." (Illustrated.)
6. *New York Herald.*—"Narrow Escape of M. Santos Dumont."
10. *British Photography.*—"Kite Flying and Photography."
15. *The Tatler.*—"The Gentle Art of Kite Flying." (Illustrated.)
26. *Le Monde Sportif.*—"La Traversée des Pyrénées en Ballon."
28. *Morning Advertiser.*—"A Balloon Competition."
Aug. 5. *The Car.*—"From Cloudland to Earth."
10. *Daily News.*—"Ballooning byMoonlight."
— *Daily Telegraph.* — "Airship Experiments."
— *Standard.*—"The Conquest of the Air."
— *Morning Post.*—"Mr. Bacon's Ballooning Experiments."
12. *The Sphere.*—"The New Hot Air Military Balloon."
21. *Morning Post.*—"Aërial Highways."
26. *The Car.*—"Aëronautics in Warfare."
29. *The Sphere.*—"War Kites at the Naval Manœuvres."
30. *New York Herald.*—"The Conquest of the Air."
Sept. 9. *The Car.*—"A Lady's First Ballcoming Experience."
18. *Daily News.*—"The Airship's Voyage."
— *Globe.*—"Mr. Goossen's Balloon Journey." Letter to the Editor.
— *Evening News.*—"The First Flight."
— *New York Herald.*—"Mr. Stanley Spencer's Flight Over London."
21. *Daily Mail.*—"15,000 Feet Above the Alps."
22. *Daily Chronicle.* — "Count Zeppelin's Airship."

Applications for Patents.

(*Made in July, August, and September.*)

The following list of Applications for Patents connected with Aëronautics has been specially Compiled for the AËRONAUTICAL JOURNAL by Messrs. BROMHEAD & Co., Patent Agents, 33 Cannon Street, London, E.C.

15139. July 8. WILLIAM BEEDLE. **Improvements in the means of steering Airships, and mechanism for controlling same.**

15158. July 8. GEORGE EDWARD WADE. **A Machine (contrivance or vehicle) for Aerial Navigation.**

17651. August 14. JOHN FREDERICK DUKE. **Improvements in and relating to Airships or vessels, and the like.**

17743. August 17. FRANCIS ALEXANDER BARTON and FREDERICK WALKER. **An equipoise for Airships and like Apparatus for Aerial Navigation.**

18768. August 31. MAX BOURCART. **Improvements in Flying Machines.**

18920. September 2. FRANCIS ALEXANDER BARTON. **Improvements in Flying Machines.**

19347. September 8. WALTER ACWORTH GREEN. **Improvements in and relating to Flying Machines and the like.**

19672. September 12. GEORGE DAWE. **Improvements in Aerial Machines.**

*Christian and Surname*_____

*Rank or Profession*_____

*Address*_____

_____

*Date*_____ 19

SIR,

Please to propose my name as a Member of the Aëronautical Society of Great Britain.

If elected, I undertake to pay the subscription of One Guinea per annum (unless I shall give previous notice of withdrawal), or to compound for my annual subscriptions by the payment of Ten Guineas, and to abide by the Rules of the Society.

*(Signature)*_____

To ERIC STUART BRUCE, ESQ.,

Hon. Sec. Aëronautical Society,

53, VICTORIA STREET, WESTMINSTER, LONDON, S.W.

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P.T.O.